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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,206	10/30/2000	Yoshihito Asao	Q61449	6062

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SUGHRUE, MION, ZINN, MACPEAK, SEAS
2100 Pennsylvania Avenue, N.W.
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EXAMINER

MULLINS, BURTON S

ART UNIT PAPER NUMBER

2834

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/698,206

Applicant(s)

ASAO ET AL.

Examiner

Burton S. Mullins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 8-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1 and 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kusase (JP 3-226251) in view of Kreuzer et al. (US 4,402,129) and Rich (US 4,102,040).
Kusase generally teaches applicant's invention of an alternator (Fig.3) comprising: a rotor 18 having a number of claw-shaped magnetic poles (not numbered, see Fig.3) for alternately forming north-seeking (N) and south-seeking (S) poles about a rotational circumference; a stator 14 having an annular stator core 15, polyphase winding 16 installed in the core, and a number of slots (not numbered, see Figs.8-9) extending axially at a predetermined pitch in a circumferential direction; the polyphase winding (phases X,Y&Z) comprising a number of winding portions (not numbered, see Figs.8-9) in which long strands of wire are wound, the strands folding outside the slots at both axial ends (Figs.2,4,5&6) to form "coil end groups" 16a/16b at axial end surfaces of said stator core (Fig.4).
Kusase does not teach: 1) that the long strands of wire alternately occupy an inner layer and an outer layer in a slot depth direction within said slots (Figs.8-9) at intervals of a predetermined number of slots; and 2) an abutting portion on the core used to form an annular shape by joining core ends at the abutting portion.

Regarding (1), Kreuzer teaches a three-phase AC generator wound with a two-layer, polyphase winding comprising a number of winding portions 40, 41 and 42 (Fig.1) wherein each winding portion comprises a long strand of wire wound so as to alternately occupy an

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inner layer and an outer layer in a slot depth direction within said slots (Figs.1-2) at intervals of a predetermined number of slots, the strands folding outside the slots at both axial ends (Fig.1) to form coil end groups at axial end surfaces of the stator core. Kreuzer's two-layer winding and method therefor achieves a higher space utilization factor (c.1, lines 20-22 & 25-30; c.2, lines 34-38).

Regarding (2), Rich teaches a method of forming an alternator stator core stack 5 made from stacked individual laminations 1, introduced into a bending machine, and bent by rollers 6 into a cylindrical ring, with ends of the stack 5 fastened together opposite one another at an "abutting portion" (c.9, lines 20-23; Figs.2-3&8). The process described by Rich simplifies construction and reduces the cost of manufacture (c.1, lines 53-65).

It would have been obvious to one having ordinary skill in the art to modify Kusase and provide a double-layer, alternating position winding per Kreuzer since this would have been desirable to achieve a higher space utilization factor, and further to provide a stator core with an abutting portion per Rich since this would have been desirable to simplify construction of the core and reduce manufacture.

Regarding claim 3, the back of Rich's core is inseparable and integral with the core.

Regarding claim 5, Rich teaches notches 4 in the stator core.

Regarding claim 6, as seen in Fig.2 of Rich, the abutting portion is formed inside (the middle of) a tooth.

3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kusase (JP 3-226251) in view of Kreuzer et al. (US 4,402,129) and Shinichiro (JP 1-252141). Kusase, as described above, substantially teaches applicant's invention including strands folding outside

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the slots at both axial ends (Figs.2&4-6) to form "coil end groups" 16a/16b at axial end surfaces of said stator core (Fig.4). However, Kusase does teach: 1) long strands of wire alternately occupying an inner layer and an outer layer in a slot depth direction within said slots (Figs.8-9) at intervals of a predetermined number of slots; and 2) an abutting portion on the core used to form an annular shape by joining core ends at the abutting portion.

Regarding (1), Kreuzer teaches a three-phase AC generator wound with a two-layer, polyphase winding comprising a number of winding portions 40, 41 and 42 (Fig.1) wherein each winding portion comprises a long strand of wire wound so as to alternately occupy an inner layer and an outer layer in a slot depth direction within said slots (Figs.1-2) at intervals of a predetermined number of slots, the strands folding outside the slots at both axial ends (Fig.1) to form coil end groups at axial end surfaces of the stator core. Kreuzer's two-layer winding and method therefor achieves a higher space utilization factor (c.1, lines 20-22 & 25-30; c.2, lines 34-38).

Regarding (2), Shinichiro teaches a stator core 7 formed from sheets 1 and plural arc-shaped divided core portions 4 and an abutting portion (not numbered) formed when the core is bent and ends of the core are brought together (abstract).

It would have been obvious to one having ordinary skill in the art to modify Kusase and provide a double-layer, alternating position winding per Kreuzer since this would have been desirable to achieve a higher space utilization factor, and further to provide a stator core with an abutting portion per Shinichiro since this would have been desirable to simplify construction of the core and reduce manufacture.

Regarding claim 2, the core of Shinichiro comprises plural "divided" teeth parts 4.

Regarding claim 3, the back of Shinichiro's core is inseparable and integral with the core.

Regarding claim 5, Shinichiro teaches notches 5 in the stator core.

Regarding claim 6, as seen in Fig.1 of Shinichiro, the abutting portion is formed inside (the middle of) a tooth.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Kusase in combination with either Kreuzer and Rich, or Kreuzer and Shinichiro, as applied to claim 6 above, and further in view of Gotou (US 4,692,646). Neither Kusase, Kreuzer, Rich or Shinichiro teach stator teeth of different sizes.

Gotou teaches a permanent magnet machine including stator 24 having "short" and "long" teeth of different circumferential width so as to reduce cogging (Fig.5, c.3, lines 20-50).

It would have been obvious to one having ordinary skill to modify the stator teeth of Kusase in combination with either Kreuzer and Rich, or Kreuzer and Shinichiro, and provide different circumferential widths per Gotou since this would have been desirable to reduce cogging. Regarding placement of the abutting portion inside the larger tooth, this would be one of two logical choices when the teachings of Gotou are combined by one of ordinary skill with Kusase and either Kreuzer and Rich, or Kreuzer and Shinichiro, since the Rich and Shinichiro references teach abutting portions formed inside a tooth.

Response to Arguments

5. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection. The term "long strand of wire" (claim 1) is taken to mean a continuous wire, as opposed to conductors formed by U-shaped segments of wire, e.g. Umeda's Fig.9 embodiment (US '813).

6. Examiner notes that non-elected claims 8-13 still remain in the application.

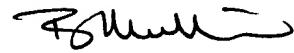
Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Umeda (US '813 and US '810) pertain to claw-pole alternator stator windings comprising long strands of wire. DE 199 22 794 discloses an AC machine, in particular a motor, having a polyphase, multi-layer stator winding composed of long strands of wire for each phase (Fig.5). JP 63-161855 pertains to a double layer synchronous motor winding. DE 39 01 098 pertains to a similar polyphase, two-layer stator winding. JP 62-296732 pertains to a three-phase armature winding with a double-layer winding.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 305-1341 for regular communications and 305-1341 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.



Burton S. Mullins
Primary Examiner
Art Unit 2834

bsm
February 25, 2003